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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/163,199	09/30/1998	HITOSHI FUKUSHIMA	04783/026001	9722

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EXAMINER	
EPPERSON, JON D	
ART UNIT	**PAPER NUMBER**
1639	

DATE MAILED: 08/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/163,199	FUKUSHIMA ET AL.	
	Examiner	Art Unit	
	Jon D Epperson	1639	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 May 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,7,8 and 27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,7,8 and 27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *6/15/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Status of the Application

1. The Response filed May 17, 2004 is acknowledged.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Status of the Claims

3. Claims 1, 7 and 8 were pending. Applicants amended claim 1 and added claim 27. Therefore, claims 1, 7, 8 and 27 are currently pending and examined on the merits.

Withdrawn Objections/Rejections

4. All outstanding rejections are/or objections are withdrawn in view of Applicants' arguments and/or amendments.

New Rejections

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1, 7, 8 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sangodkar et al. (Sangodkar, H.; Sukeerthi, S.; Srinivasa, R.S.; Lal, R.; Contractor, A.Q. "A Biosensor Array Based on Polyaniline" *Anal. Chem.* **1996**, 68, 779-783) and Lemmo et al. (Lemmo, A.V.; Fisher, J.T.; Geysen, H.M.; Rose, D.J. "Characterization of an Inkjet Chemical Microdispenser for Combinatorial Library Synthesis" *Anal. Chem.* **1997**, 69, 543-551) and Newman et al. (Newman; J.D.; Turner, A.P.F. "Ink-jet printing for the fabrication of amperometric glucose biosensors" *Analytica Chimica Acta*, **1992**, *262*, 13-17) (IDS Ref. AR) and Trojanowicz et al. (Trojanowicz, M.; Geschke, O.; Krawczyk, T.; Cammann, K. "Biosensors based on oxidases immobilized in various conducting polymers" Sensors and Actuators B 28 (**1995**) 191-199).

For ***claims 1 and 27***, Sangodkar et al. (see entire document) teach the manufacture of a biosensor array based on polyaniline, which reads on claim 1. For

example, Sangodkar et al. teach the deposition of a polyaniline electro-conductive polymer thin film on the surface of an array of gold interdigitated microelectrodes on oxidized silicon wafers, which reads on claim 1 (e.g., see Sangodkar et al., abstract; see also figures 1-3 wherein the "two dimensional array" of IMPs are disclosed in figure 2 and the method for depositing the polyaniline thin film is shown in figure 3; see also page 780, column 2, last paragraph). Please note that the polyaniline conducting film is deposited in different regions of the two-dimensional sensor array (e.g., see figure 2) to produce a device that is specific to a group of chemicals (e.g., see abstract wherein it is shown that the device is specific for a group of chemicals including glucose). In the "glucose" embodiment the enzyme "glucose oxidase" was "absorbed" by the polymer (e.g., see page 780, column 2, last paragraph) (Please note that the "glucose oxidase" is an "aromatic molecule" because it contains many "aromatic" amino acids including, for example, 18 Phe residues, see attached primary structure which shows that the aromatic molecules are an "inherent" feature of the glucose oxidase).

With respect to the limitation that the solution has a viscosity "of about 3 centipoise or less", it is noted that "[p]roducts of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). Since the reference discloses a solution comprising applicants preferred "polyaniline" (e.g., see specification, page 7, line 12), this solution is deemed to have the properties applicants claim. "When the PTO

shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not." *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). The Office does not have the facilities to make such a comparison and the burden is on the applicants to establish the difference. See *In re Best*, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977) and *Ex parte Gray*, 10 USPQ 2d 1922 1923 (PTO Bd. Pat. App. & Int.).

For ***claim 8***, Sangodkar et al. disclose poly-silicon thin film transistors (e.g., see Sangodkar et al., abstract, see also figure 2).

The prior art teachings of Sangodkar et al. differ from the claimed invention as follows:

For ***claims 1 and 27***, Sangodkar et al. are deficient in that they do not teach the use of inkjet technology to deposit the electro-conductive polymer. Sangodkar et al. only teach the use of electrochemical deposition using a syringe (e.g., see Sangodkar et al., figure 3). In addition, Sangodkar et al. are deficient in that they do not teach the use of electro-conductive polymers like polypyrrole. Sangodakar et al. only teach the use of "polyaniline" (e.g., see Sangodkar et al., Title).

For ***claim 7***, Sangodkar et al. are deficient in that they do not teach the use of a plastic substrate.

However, the combined teachings of Lemmo et al. and Newman et al. and Trojanowicz et al. disclose the following limitations that are deficient in Sangodkar et al.:

For ***claims 1 and 27***, Lemmo et al. (see entire document) teach the use of inkjet technology for the formation of combinatorial libraries including applications to

biosensors (e.g., see Lemmo et al., abstract; see also page 544, column 1, paragraph 2, "Inkjet-type dispensing ... have been used in many areas of chemistry ... including fabrication of biosensors"). Furthermore, Lemmo et al. teach that piezoelectric devices may be used in the inkjet dispenser (e.g., see Lemmo, page 544, column 1, paragraph 2, "Inkjet-type dispensing, both solenoid and piezoelectric, have been used") and explicitly refers to Newman et al. as an example of a piezoelectric Inkjet dispenser (e.g., see Lemmo et al., page 544, column 1, reference 2 at bottom of column). Newman et al. teach an ink jet nozzle with a piezo-electric device for ejecting solution wherein an electric signal is used to deform the piezo-element (e.g., see Newman et al., page 14, column 1, "Ink-jet nozzle" section; see also figure 1). In addition, Trojanowicz et al. teach the use of "polypyrrole" electro-conducting polymers in biosensors (e.g., Trojanowicz et al., abstract).

For ***claim 7***, the combined teachings of Lemmo et al. and Newman et al. disclose a plastic substrate (e.g., see Newman et al., page 14, column 1, last paragraph wherein PVC is used as a substrate to make the electrodes).

It would have been obvious to one skilled in the art at the time the invention was made to make a biosensor array based on electro-conductive polymers as taught by Sangodkar et al. with the inkjet technology as disclosed by the combined teachings of Newman et al. and Lemmo et al. and the "polypyrrole" electro-conducting polymer as taught by Trojanowicz et al. because Lemmo et al. explicitly states that inkjet technology is beneficial for producing combinatorial libraries for biosensors, which would encompass the biosensor disclosed by Sangodkar et al. (e.g., see Lemmo et al., page 544,

column 1, paragraph 2, "Inkjet-type dispensing, both solenoid and piezoelectric, have been used in many areas of chemistry and science including fabrication of biosensors") and Trojanowicz et al. explicitly states that polypyrrole can be used to replace polyaniline in biosensors that adsorb glucose oxidase, which would also encompass the biosensors disclosed by Sangodkar et al. (e.g., see Sangodkar et al., abstract wherein polyaniline is compared to polypyrrole). Furthermore, one of ordinary skill in the art would have been motivated to use the inkjet technology as taught by the combined teachings of Newman et al. and Lemmo et al. because according to Lemmo et al. explicitly states that they have advantages over the syringe based dispensing techniques disclosed by Sangodkar et al. (see Lemmo et al., page 544, column 1, paragraph 2, "The use of inkjet-type dispenser for delivering chemical reagents has several distinct advantages over syringe or pump-based pipette dispensing: (1) The dispense process is a non-contact dispense ... (2) The dispense time is rapid ... (3) ... the mean time between failure is high ... (4) low cost"). In addition, one of ordinary skill in the art would have been motivated to use polypyrrole to replace the polyaniline disclosed by Sangodkar et al. because Trojanowicz explicitly states that polypyrrole is better than polyaniline (e.g., see Trojanowicz et al., "polypyrrole ... and polyaniline are compared as matrices for the immobilization of glucose oxidase in the preparation of amperometric glucose biosensors ... The best sensitivity of response is obtained for ... polypyrrole").

Furthermore, one of ordinary skill in the art would have reasonably expected to be successful because Lemmo et al. explicitly states that inkjet technology can be successfully used to replace the syringe based methods disclosed in Sangodkar et al. (e.g.,

see Lemmo et al., page 544, column 1, paragraph 2). In addition, Trojanowicz et al. provide successful examples showing that polypyrrole can be used as a biosensor (e.g., see Trojanowicz et al., abstract and figures)

Conclusion

Applicant's amendment necessitated any new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jon D Epperson whose telephone number is (571) 272-0808. The examiner can normally be reached Monday-Friday from 9:00 to 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Wang can be reached on (571) 272-0811. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-1600.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jon D. Epperson, Ph.D.
August 19, 2004